

US EPA ARCHIVE DOCUMENT



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

**SEP 16 2010**

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED 70031680000107502912

Ms. Sandy Gruzesky  
Director, Division of Water  
Kentucky Department for Environmental Protection  
200 Fair Oaks Lane, 4th Floor  
Frankfort, Kentucky 40601

Re: Notice of Specific Objection – Laurel Mountain Resources (KY0108715)

Dear Ms. Gruzesky:

On June 18, 2010, the above referenced National Pollutant Discharge Elimination System (NPDES) draft permit was received by the United States Environmental Protection Agency (EPA) Region 4 from the Kentucky Division of Water (KDOW). On June 30, 2010, EPA sent a letter to KDOW exercising the right to a 90-day review in accordance with Section IV.B.3 of the Commonwealth of Kentucky/EPA NPDES Program Memorandum of Agreement (MOA) and 40 Code of Federal Regulations (CFR) § 123.44(a). EPA has completed a review of the draft permit and is providing notice of its specific objection to the draft permit in accordance with MOA Section IV.B.7 and 40 CFR §123.44.

The draft permit is for an existing coal mine that was previously covered by a General Permit and the applicant is seeking its first Individual Permit. The surface coal mine is within eco-region 69 and has 4 valley fills. The draft permit would authorize the discharge of coal mine effluent via 18 outfalls (4 outfalls are in-stream structures) into 3 receiving water bodies (RWBs): Raccoon Branch, Salyers Branch, and Saltlick Creek. Raccoon Branch and Salyers Branch are categorized as high quality with the following designated uses: warm water aquatic habitat (WAH), primary/secondary contact recreation, and domestic water supply. The designated uses for Saltlick Creek are WAH and primary/secondary contact recreation. Saltlick Creek (mile 0.0 – 6.8) has a WAH use impairment for coal mining related pollutants according to the 2008 Clean Water Act (CWA) § 303(d) list: sedimentation/siltation, sulfates, and an unknown pollutant.<sup>1</sup> Raccoon Branch and Salyers Branch have a low flow rate of zero cubic feet per second (cfs) for 7 consecutive days occurring on average once every 10 years (7Q10) and Saltlick Creek has a 7Q10 of 0.1 cfs. Right Fork Beaver Creek (mile 0.0 – 17.4) is the downstream RWB of Raccoon Branch, Salyers Branch, and Saltlick Creek, and is approximately 1.5 miles from the project's closest outfall. Right Fork Beaver Creek has a WAH use impairment for coal mining related pollutants according to the 2008 CWA § 303(d) list: pH, sedimentation/siltation, sulfates, and total dissolved solids (TDS).<sup>2</sup>

<sup>1</sup> KDOW's draft 2010 CWA § 303(d) list which has not yet been approved by EPA shows Saltlick Creek has a WAH impairment for coal mining related pollutants: sedimentation/siltation, specific conductivity, and total dissolved solids.

<sup>2</sup> KDOW's draft 2010 CWA § 303(d) list which has not yet been approved by EPA shows Right Fork Beaver Creek has a WAH impairment for coal mining related pollutants: pH, sedimentation/siltation, specific conductivity, and TDS.

EPA regulations at 40 CFR § 123.44(c), identify the bases upon which EPA may object to an NPDES permit proposed by a state, which include:

“The permit fails to apply, or to ensure compliance with, any applicable requirement of this part”<sup>3</sup> [123.44(c)(1)]; and

“The effluent limits of a permit fail to satisfy the requirements of 40 CFR 122.44(d)” [123.44(c)(8)].

EPA’s objections to the draft permit fit within these authorized bases for objections to proposed State permits. EPA’s objection relates to KDOW’s failure to conduct an adequate reasonable potential analysis (RPA), in accordance with 40 CFR §122.44(d), to determine whether the proposed discharge will cause, have the reasonable potential to cause, or contribute to a violation of state water quality standards (WQS), and KDOW’s failure to include in the permit effluent limits necessary to ensure that the proposed discharge will not cause or contribute to a violation of WQS, as required by the CWA § 301(b)(1)(C), 40 CFR §122.4(a) and (d)), and 40 CFR §122.44(d)(1).

EPA’s objections consider, in part, the emerging science regarding the impacts of surface coal mining on water quality. Scientific literature has increasingly recognized the relationship between discharges from surface coal mining operations and downstream water quality impairments.<sup>4</sup> In addition to these studies, KDOW’s 2008 CWA § 303(d) list of impaired waters identifies 1,199 stream miles in the Upper Kentucky River watershed, 487 stream miles in the Upper Cumberland River watershed, and 780 stream miles in the Big Sandy/Little Sandy/Tygart Creek watershed as impaired with coal mining identified as a suspected source. The “2008 Integrated Report to Congress on Water Quality in Kentucky” (305(b) Report) ranks TDS as the seventh leading cause of pollution to Kentucky rivers and streams and ranks Specific Conductance (SC) as seventeenth. Only 12% of waters statewide have been assessed for impairments, and based on in-stream data available from surface mining permit applications and other sources, many unassessed streams receiving coal mine discharges are likely failing to meet WQS.<sup>5</sup>

<sup>3</sup> This part refers to 40 CFR Part 123, which includes at 40 CFR §123.25 a list of additional regulations applicable to State NPDES Programs. The regulations cited as a basis for objection in this letter are either contained in Part 123 or made applicable to state programs by 40 CFR §123.25.

<sup>4</sup> A 2003 published study, “Field and Laboratory Assessment of a Coal Processing Effluent in the Leading Creek Watershed, Meigs County, Ohio” by Kennedy, et al. linked elevated Specific Conductivity (SC) levels in the effluent to impaired, sensitive aquatic fauna. A 2004 Kentucky Department for Environmental Protection, Division of Water, Water Quality Branch study, “Effects of Surface Mining and Residential Land Use on Headwater Stream Biotic Integrity in the Eastern Kentucky Coalfield Region” found that the wholesale loss of mayflies at mined sites indicated that these organisms are especially sensitive to coal mine drainage. Dissolved solids emanating from hollow fills are a primary cause of biological impairment because of their severe impact to mayflies (a key component of headwater stream communities) and other sensitive taxa. A 2005 published study, “Evaluation of Ionic Contribution to the Toxicity of a Coal-Mine Effluent Using *Ceriodaphnia dubia*” by Kennedy, et al. linked impairment of aquatic life to elevated TDS levels. A 2008 published study, “Downstream effects of mountaintop coal mining: comparing biological conditions using family- and genus-level macroinvertebrate bioassessment tools” by Pond, et al. found evidence indicating that mining activities have subtle to severe impacts on aquatic life and the biological conditions of a stream. A 2010 published study, “Mountaintop Mining Consequences” by Palmer, et al. shows that ecological losses downstream of coal mining valley fills are associated with increased levels of TDS/SC, sulfates, and selenium. A 2010 published study by Pond, “Patterns of *Ephemeroptera* taxa loss in Appalachian headwater streams (Kentucky, USA),” links SC as the most strongly correlated factor to *Ephemeroptera* abundance in streams impacted by mining and residential development. A draft report by EPA, “The Effects of Mountaintop Mines and Valley Fills on Aquatic Ecosystems of the Central Appalachian Coalfields,” found effects that include resource loss, water quality impairment, and adverse effects on aquatic resources. Finally, another draft report by EPA, “A Field-based Aquatic Life Benchmark for Conductivity in Central Appalachian Streams” recognizes stream-life impacts associated with SC.

<sup>5</sup> As noted, Saltlick Creek, which would receive direct discharges authorized by the draft permit is already on Kentucky’s CWA § 303(d) list as a result of impacts from coal mining-related pollutants. In addition, Right Fork Beaver Creek, which is approximately 1.5 miles from the nearest proposed outfall, is also impaired as a result of impacts from coal mining-related pollutants.

This objection is also informed by the Permit Quality Review (PQR) recently conducted by EPA of State NPDES permitting practices for surface coal mines in West Virginia, Kentucky, Tennessee, and Ohio.<sup>6</sup> The PQR identified widespread concerns related to effective protection of downstream water quality consistent with CWA requirements, in particular with respect to compliance with narrative WQS. NPDES regulations at 40 CFR § 122.44(d)(1)(vi) make clear that NPDES permits must contain provisions implementing narrative WQS, and the RPA that must be completed for numeric WQS must also be completed for narrative standards.<sup>7</sup> In the draft permit and fact sheet, RPAs for a variety of numeric and narrative Kentucky WQS are either absent or inadequate.

A more detailed explanation of the reasons for EPA's objections, the actions that KDOW must take to eliminate the objections is provided below.

**1. KDOW did not perform an adequate RPA for some pollutants and did not include appropriate effluent limits.**

NPDES Permits must contain limitations for all pollutants that have the reasonable potential to cause or contribute to violations of numeric or narrative WQS, as required under 40 CFR §122.44(d). An adequate RPA is necessary to determine if the RWB has sufficient assimilative capacity to ensure that the proposed discharges do not cause or contribute to violations of applicable numeric and narrative WQS. With respect to some coal mining-related pollutants (metals, sulfates, SC, and TDS), KDOW did not perform any RPA, and failed to consider available information indicating that the proposed discharges do have the reasonable potential to cause or contribute to violations of applicable WQS. In the case of some other coal-mining related pollutants (iron and total suspended solids (TSS)), KDOW performed an RPA, but failed to include in the draft permit effluent limits determined to be necessary by its own analysis. As a result, discharges that would be authorized by this permit may cause or contribute to violations of WQS.

**A. KDOW did not perform any RPA for some pollutants that are generally known to be present at significant levels in coal mine discharges.**

KDOW did not conduct an RPA for metals (except for iron), sulfates, SC, or TDS. In the fact sheet, KDOW states that it had insufficient data to conduct the RPA for these pollutants and therefore is requiring five quarters of effluent monitoring for these pollutants, coupled with in-stream chemical and biological monitoring. KDOW proposes to conduct the required RPA during the permit term after it receives the

---

<sup>6</sup> Review of CWA § 402 Permitting for Surface Coal Mines by Appalachian States: Findings and Recommendations (August 4, 2010).

<sup>7</sup> Kentucky's WQS include narrative standards for the protection of aquatic life, SC, TDS. "Total dissolved solids or specific conductance shall not be changed to the extent that the indigenous aquatic community is adversely affected." 401 Kentucky Administrative Regulations (KAR) 10:031, Section 4(1)(f); and "Surface waters shall not be aesthetically or otherwise degraded by substances that ... injure, are chronically or acutely toxic to or produce adverse physiological or behavioral responses in humans, animals, fish and other aquatic life." 401 KAR 10:031, Section 2. In addition, Kentucky has narrative standards for TSS and settleable solids which would address the sedimentation/siltation impairments in Saltlick Creek and Right Fork Beaver Creek. See 401 KAR 10:031(4)(1)(g) and (h): (g) Total suspended solids. Total suspended solids shall not be changed to the extent that the indigenous aquatic community is adversely affected; (h) Settleable solids. The addition of settleable solids that may alter the stream bottom so as to adversely affect productive aquatic communities is prohibited.

results of the required monitoring, and reopen the permit if necessary to add water quality based effluent limits (WQBELs).

While additional data on water quality is always welcome, this approach by KDOW does not consider available, valid, and representative data showing that the proposed discharges have the reasonable potential to cause or contribute to violations of WQS. Given the existence of information indicating that reasonable potential exists, KDOW's proposal to conduct the RPA during the permit term does not comply with the CWA and its implementing regulations, which require that the permit contain WQBELs for all discharges that have reasonable potential to cause or contribute to a violation of WQS (40 CFR 122.44(d)(1)(iii, iv, vi)).

In explaining its decision to not conduct the required RPA for these pollutants, KDOW states in the Fact Sheet:

The Division of Water's "procedures for determining "reasonable potential" require a minimum of five (5) effluent samples for analysis. The permittee in conformance with the application requirements of Form C submitted one effluent analysis. Therefore, insufficient effluent data from the operation is available to determine the "reasonable potential" for the permittee to cause or contribute to an excursion above a water quality standard. The permit has been conditioned to require the collection and submission of this analytical data within two (2) years of its effective date."<sup>8</sup>

EPA believes that these procedures are an insufficient basis for KDOW's failure to perform a RPA based on available data. KDOW's procedures also provide, in Section V, that "in determining reasonable potential, the agency will assume any single data point to be representative of the discharge." Moreover, the procedures KDOW cites and their preference for having a more robust data set for conducting an RPA cannot justify a failure to conduct the RPA using valid and representative data and information that is available. In cases where site-specific data is unavailable, KDOW can characterize the effluent using data from similar discharges from nearby or adjacent mining facilities having similar geologic characteristics as the mine under review, and/or from ambient data collected as part of the CWA § 404 or Surface Mining Control and Reclamation Act permit applications, or other sources of information about the likely composition of the effluent. KDOW could have independently sought to obtain such data or rejected the application as not sufficient and required additional data from the applicant. Instead, KDOW submitted the draft

---

<sup>8</sup> The KDOW approach of authorizing the discharge without water quality based effluent limitations and monitoring to resolve uncertainties regarding the effluent composition might be appropriate if available information, including information about the likely composition of the effluent, such as data from reference facilities, available instream data, and scientific literature about the relationship between coal mine discharges and impacts to aquatic life, did not support a determination that there is reasonable potential that the proposed discharges will cause a violation of WQS. It is not uncommon for permitting authorities to authorize a discharge and require monitoring to address data gaps and later revisit the reasonable potential analysis to ensure ongoing protection. EPA is not rejecting such an approach where warranted by available information. In this case, however, existing information regarding the relationship between coal mining discharges and water quality impairments, together with available information regarding the effluent and the receiving streams, renders such an approach inconsistent with the CWA.

permit to EPA without considering or obtaining additional effluent data, even though the mine in question has been operating for years.

In addition to data from other similar and nearby mines, and available in-stream data, KDOW should also have considered and addressed the status of RWBs as already impaired for coal-mining pollutants, and the numerous studies, including those identified in footnote 4, demonstrating a relationship between discharges from surface coal mines and downstream water quality impairments. KDOW has discounted the findings of those studies as not necessarily representative of site-specific conditions, but failed to develop site-specific information to counter the studies and inform the RPA for the draft permit. Given the existence of information indicating that reasonable potential does exist, KDOW's approach of deferring an RPA to the middle of the permit term is inadequate. If EPA were issuing this permit, EPA would perform a RPA using EPA's Technical Support Document (TSD) for Water Quality-Based Toxics Control, which provides guidance on conducting RPAs and setting WQBELs. EPA would include in the permit effluent limits necessary to meet WQS based on the results of the RPA. In performing the RPA, EPA would consider relevant and available information, including the studies cited above in footnote 4, and available data (including data from discharge monitoring reports and surface water monitoring reports, and representative data from other sites). EPA collected in-stream water quality data from within Saltlick Creek on May 25, 2010, which EPA would consider if issuing the permit and is enclosed for your reference.

**B. KDOW's draft permit does not include effluent limits determined to be necessary by its own RPA for iron and TSS.**

KDOW conducted an RPA for certain pollutants (iron, TSS, and settleable solids) for which it deemed existing data adequate to support its analysis. However, KDOW did not include effluent limits for iron and TSS in the draft permit that, under its own RPA, are necessary to ensure compliance with WQS.

**i. Iron**

KDOW conducted an RPA for iron and determined that a average monthly limit (AML) of 3.5 mg/l was necessary to ensure compliance with Kentucky's chronic aquatic life criterion, and a maximum daily limit (MDL) of 4.0 mg/l was necessary to ensure compliance with Kentucky's acute aquatic life criterion. KDOW then compared these limits to effluent limitation guideline (ELG) based limits to determine which was more stringent and therefore controlling. However, in the draft permit KDOW did not apply the WQBELs to discharges from post-mining areas and precipitation-induced discharges even though the WQBELs applicable limits were more stringent. In addition, KDOW also did not apply new source performance standards (NSPS) based limits even though the operation has been identified in the draft permit as meeting the regulatory definition of "new source" pursuant to 40 CFR § 434.11(j). Accordingly, the draft permit is inadequate in the absence of effluent limits for iron consistent with those specified in Table 1. These limits reflect the correct iron limits based on

the facility's status as a "new source" and the circumstances where WQBELs are controlling because they are more stringent than the otherwise applicable limits.

Table 1 - Effluent Requirements for Iron

Pollutant	Active Mining		Post Mining		Precipitation	
	MDL <sup>1</sup>	AML <sup>2</sup>	MDL <sup>1</sup>	AML <sup>2</sup>	MDL <sup>1</sup>	AML <sup>1</sup>
Iron (mg/l)	4.0	3.0	4.0	3.0	4.0	3.5

<sup>1</sup> WQBEL's

<sup>2</sup> NSPS for active and post mining areas

## ii. TSS

KDOW conducted an RPA for TSS and found that discharges controlled by the effluent limits established under the ELGs and New Source Performance Standards at 40 CFR § 434 would not cause or contribute to violations of WQS. KDOW made this determination even though the draft permit would authorize discharges into streams that are already impaired for sedimentation/siltation.

KDOW based its conclusion for TSS on a 2006 study which suggested that impacts to benthic macroinvertebrates were observed when in-stream TSS concentration was increased by 40 mg/l or more.<sup>9</sup> Based on the "worst case" scenario of a pristine stream with an average flow of zero cfs, KDOW arrived at an end of pipe effluent limit of 40 mg/l. Noting that this is less stringent than the ELG-based numeric limit of 35 mg/l as a monthly average, KDOW's fact sheet, at page 10, states that "the numeric effluent guideline requirement prevails." Under KDOW's draft permit, however, the more stringent ELG-based numeric limit of 35 mg/l is not applicable to post-mining discharges or precipitation-induced discharges. The draft permit does not impose any TSS effluent limit on discharges from post-mining areas or on precipitation-induced discharges, since the ELG does not impose any limit on TSS for precipitation-induced or post-mining discharges. Thus, with respect to discharges of TSS from post-mining areas and precipitation-induced discharges, the draft permit fails to ensure compliance with WQS. To adequately protect water quality, the draft permit must be revised to make clear that the WQBEL limit of 40 mg/l applies to discharges from post-mining areas and precipitation-induced discharges.

## C. Additional Errors in KDOW's RPA.

EPA notes other errors in KDOW's RPA, which are similar to those EPA has seen when reviewing other KDOW permits. First, KDOW's RPA assumes a background

<sup>9</sup> Suspended Solids and Turbidity Requirements of Freshwater Aquatic Life and Example Relationship Between TSS (mg/l) and Turbidity (NTUs) for a Treated Municipal Effluent (Robertson-Bryan, Inc., March 2006).

concentration of zero. This is not a reasonable assumption for a site that is already known to be receiving discharges from active mining, except in the case of streams for which the 7Q10 flow is 0.0 cfs, in which case the RPA would be based on effluent alone without dilution from stream flow.<sup>10</sup> KDOW should have obtained actual in-stream data for iron or, if such data was unavailable, used stream data from a reference stream with a similar flow and level of mining activity. Alternatively, KDOW can request the applicant supply in-stream background data prior to permit issuance pursuant to 40 CFR § 122.21(g)(13). Second, KDOW's RPA assumes that discharges from the active mining areas are precipitation-dependent. Sedimentation ponds at surface coal mining sites can discharge continually or intermittently but frequently. Thus, in the absence of data regarding discharge flow duration and frequency, it is not appropriate to assume that the discharges will only occur with precipitation. To ensure that protective limits are included in the permit, KDOW should have assumed continuous discharges. Third, KDOW inappropriately applied a mixing zone when conducting its RPA for the chronic aquatic life criterion, which is not appropriate for a receiving stream that is dominated by effluent.<sup>11</sup> Each of these errors can have the effect of underestimating the reasonable potential that these discharges will cause or contribute to an exceedance of WQS.

## **2. Effluent limits are necessary to ensure that discharges do not cause or contribute to violations of WQS.**

Effluent limitations are required for any pollutant or pollutant parameters for which there is reasonable potential for the discharge to cause or contribute to an excursion above WQS according to 40 CFR § 122.44(d)(1)(i). To address EPA's objection KDOW must submit a revised permit with effluent limitations that are as stringent as necessary to meet applicable narrative and numeric water quality standards.

A proposed permit and revised fact sheet must be submitted to the Agency in accordance with the provisions of 40 CFR § 123.44(j) and Section III.B.6 of the MOA. EPA also asks that KDOW submit a summary of all public comments that have been received for the draft permit and KDOW's response to them. Within ninety (90) days of the receipt of this letter, KDOW, or any interested person may request that a public hearing be held in accordance with MOA Section IV.B.7 and 40 CFR § 123.44. If a public hearing is not held and KDOW does not submit a proposed permit that has been revised to meet our specific objection within ninety (90) calendar days of receipt of this letter, exclusive authority to issue the permit passes to EPA for one permit term in accordance

---

<sup>10</sup> Assuming background concentrations of zero is inconsistent with KDOW's own procedures for conducting RPAs unless KDOW has first made a demonstration that it has reviewed all available data and information. Section V of KDOW's document entitled *Permitting Procedures for Determining Reasonable Potential* (dated May 1, 2000) states "In the absence of any data in close proximity to the discharge, the reviewer will generally assume background levels of zero for use in the respective computations. Prior to making this assumption, a review of all available data will be performed. This review will include, but not limited to data available in STORET, data collected as a result of watershed studies, and other site-specific studies when available."


<sup>11</sup> The fact sheet states that the basis for using a mixing zone is 401 Kentucky Administrative Records (KAR) 10:029, Section 4(c), which states that the mixing zone "shall not exceed 1/3 of the width of the receiving water." 401 KAR 10:029 Section 4(e) provides more guidance on the applicable use of mixing zones which states "An assigned mixing zone shall be limited to an area or volume that shall not adversely affect the designated uses of the receiving water and shall not be so large as to adversely affect an established community of aquatic organisms." The streams receiving effluent from discharges authorized by the draft permit include streams with a 7Q10 of zero cfs. The use of mixing zones is not appropriate in streams where the flow rate is low or often zero, the stream width is small, and the mining discharge is the dominating cause of flow in the stream.



with 40 CFR § 123.44(h). Any requests for a hearing on the objection and the procedures for resolving any objection shall be governed by 40 CFR § 123.44, as provided in Section IV.B.7 of the MOA.

EPA commits to working with KDOW to resolve the issues in a manner that ensures that the permit will be consistent with the requirements of the CWA. If you have any questions, please call me at (404) 562-9345 or Mark Nuhfer of the Municipal and Industrial NPDES Section at (404) 562-9390.

Sincerely,



for James D. Giattina  
Director  
Water Protection Division

Enclosure A – Saltlick Creek water quality data obtained by EPA

cc: Mr. Gene Campbell  
Laurel Mountain Resources, LLC



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**REGION 4**


**Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720**


September 16, 2010

**R4-SESD-EAB**

**MEMORANDUM**

**SUBJECT:** Miller Brothers Water Chemistry Data  
SMCRA ID #836-0335 A2  
EPA Project ID: 10-0348

**FROM:** Chris Decker   
Life Scientist

**THRU:** Bobbi Carter, Chief   
Aquatic Biology Section

**TO:** Kip Tyler  
Wetlands, Coastal and Oceans Branch, WPD

Attached is the final chemical and *insitu* data that will be included in the Miller Brothers (SMCRA #836-0335 A2) investigation report. If you have any questions or comments, please feel free to contact me at (706) 355-8719, or Bobby Lewis at (706) 355-8629. Thank you for the opportunity to provide field and laboratory support for EPA's Surface Mining Initiative.

**Attachments (1)**

cc: E. Somerville  
B. Carter

Below is the final chemical and *insitu* water quality data collected at the Miller Brothers Mine site (836-0335) the week of May 24, 2010.

The following data has been evaluated for quality assurance and verified by qualified personnel from SESD. The following data includes GPS coordinates of sampling locations, insitu water quality measurements, analytical methods, and surface water analytical results. Please be advised the data should be used cautiously until the issuance of the final field investigation report discussing all data collected by SESD at the Miller Brothers site.

Station ID	Stream Name	Location Description	Latitude	Longitude
SAL01	Plummer Branch	above confluence with Raccoon Branch	37.49479	-82.88149
SAL02	Patton Fork	above confluence with Plummer Branch	37.5004	-82.89502
SAL03	Plummer Branch	above confluence with Patton Fork	37.49409	-82.90046
SAL04	unnamed trib to Saltlick Creek	in Hollow Fill 10	37.48714	-82.88859
SAL05	Saltlick Creek	downstream of confluence with stream in Hollow Fill 10	37.48761	-82.88263
SAL06	Saltlick Creek	upstream of confluence with stream in Hollow Fill 10	37.48017	-82.88856

Sampling station location information, Miller Brothers (836-0335).

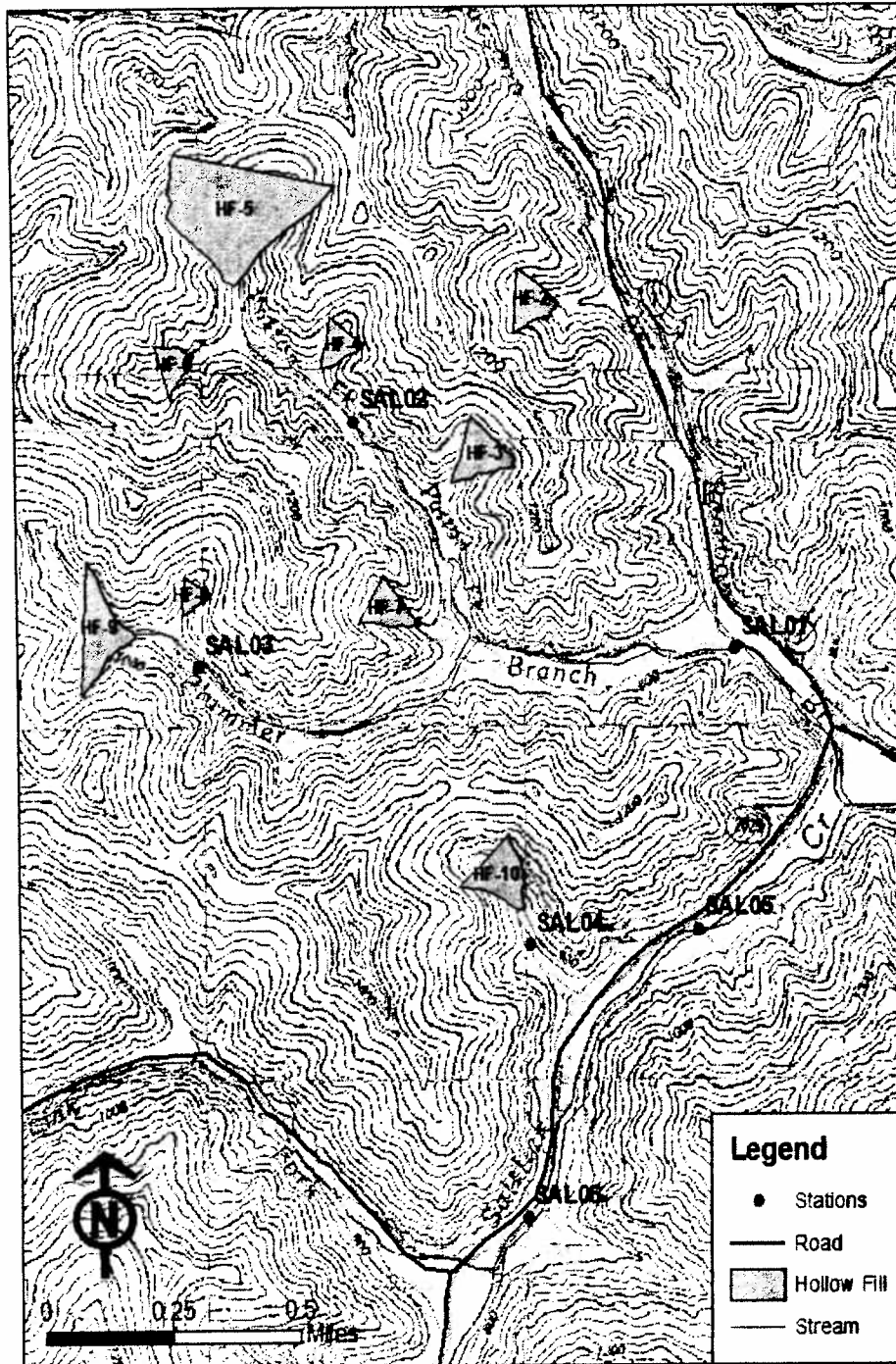
YSI in-situ water quality parameters, Miller Brothers (836-0335).

Station ID	Date	Time	Temp (°C)	Specific Cond. (µS/cm)	pH (SU)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
SAL01	5/25/2010	17:05	22.96	872	7.94	1.9	10.03
SAL02	5/25/2010	16:15	24.83	1469	7.96	5.5	10.03
SAL03	5/25/2010	15:10	21.28	567	7.77	6.0	10.06
SAL04	5/25/2010	11:15	16.12	168	7.67	6.1	10.47
SAL05	5/25/2010	9:15	17.35	521	7.81	5.5	10.5
SAL06	5/25/2010	13:00	22.54	542	8.3	4.2	10.86

Analytical methods and minimum reportable levels, Miller Brothers (836-0335).

ANALYTE	Analytical Method	Requested MRLs	Container	Preservative	Holding Time
Total Suspended	SM 2540	4.0 mg/l	1 L Poly	Ice	7 days
Total Dissolved	SM2540	4.0 mg/l			7 days
Sulfate	EPA 300.0	0.1 mg/l			28 days
Alkalinity	SM 2320				14 days
Chloride	SM 300	0.1 mg/l			28 days
Hardness	SM 2340C	10 mg/l	Calculated from magnesium and calcium		
All metals MRLs, listed below, are in µg/l.					
Antimony	EPA 200.8	2.0	1 L Poly	HNO <sub>3</sub> , pH < 2	180 days
Arsenic	EPA 200.8	2.0			
Barium	EPA	10			
Beryllium	EPA	4.0			
Cadmium	EPA 200.8	0.08			
Calcium	EPA	500			
Chromium	EPA	10			
Copper	EPA	2.0			
Iron	EPA	250			
Lead	EPA 200.8	0.4			
Magnesium	EPA	250			
Manganese	EPA	0.04			
Mercury	EPA 245.1	0.05			
Nickel	EPA	11			
Potassium	EPA	2000			
Selenium	EPA 200.8	2.0			
Sodium	EPA	2000			
Silver	EPA	0.2			
Thallium	EPA 200.8	0.24			
Yttrium	EPA	10			
Zinc	EPA	10			

Miller Brothers Sample Stations (May 2010)  
SMCRA ID: 836-0335 A2



Miller Brothers (836-0335 A2) Analytical Results

ANALYTE		UNITS	STATION ID						MRL	
			SAL01	SAL02	SAL03	SAL04	SAL05	SAL06		
Metals										
Antimony	ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5
Arsenic	ug/l	1	U	1	U	1	U	1	U	1
Barium	ug/l	74		45	58	31		55		5
Beryllium	ug/l	3	U	3	U	3	U	3	U	3
Cadmium	ug/l	0.05	U	0.05	U	0.05	U	0.05	U	0.05
Calcium	ug/l	87000		160000	88000	28000		44000		250
Chromium	ug/l	5	U	5	U	5	U	5	U	5
Copper	ug/l	2	U	2	U	2	U	2	U	2
Iron	ug/l	200		250	290	260		360		100
Lead	ug/l	0.1	U	0.26	0.14	0.16		0.14		0.1
Magnesium	ug/l	45000		95000	42000	9800		13000		250
Manganese	ug/l	63		230	120	41		130		45
Mercury	ug/l	0.1	U	0.1	U	0.1	U	0.1	U	0.1
Nickel	ug/l~	10	U	10	U	10	U	10	U	10
Potassium	ug/l	4500		6600	4000	2000		3600		3800
Selenium	ug/l	2	U	2.6	2	2	U	2	U	2
Silver	ug/l	0.1	U	0.1	U	0.1	U	0.1	U	0.1
Sodium	ug/l	20000		30000	14000	3500		36000		40000
Thallium	ug/l	0.1	U	0.1	U	0.1	U	0.1	U	0.1
Yttrium	ug/l	3	U	3	U	3	U	3	U	3
Zinc	ug/l	10	U	10	U	49		10	U	10
Non-Metals										
Hardness	mg/l	400		780	390	110		160		170
Alkalinity, Total (as CaCO3)	mg/L	71		85	53	81		130		130
Chloride	mg/L	10		5	5.1	0.87		7.8		7.8
Sulfate as SO4	mg/L	370		720	360	36		110		120
Total Dissolved Solids	mg/L	640		1200	640	160		320		340
Total Suspended Solids	mg/L	4	U	5.7	4	U	33	4.6		4

U = the analyte was not detected at or above the reporting limit indicated.

MRL = Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation.

